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Methods for

Figure 1

Streptococcus mutans ComCDE Operon



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Figure 2

A.
[ATGAAAAAACACTATCATTAAAAAATGACTTTAAAGAAATTAAGACTGATGAATTAG
AGATTATCATTGGCGGA (AGCGGAAGCCTATCAACATTTTTCCGGCTGTTTAACAGAAG
TTTTACACAAGCTTTGGGAAAA)] TAA

B. AGCGGAAGCCTATCAACATTTTTCCGGCTGTTTAACAGAAGTTTTACACAAGCTTTGGG AAAA

C. [ATGAATGAAGCCTTAATGATACTTTCAAATGGTTTATTAACTTATCTAACCGTTCTAT TTCTCTTGTTTCTATTTTCTAAGGTAAGTAATGTCACTTTATCGAAAAAGGAATTAACT CTTTTTTCGATAAGCAATTTTCTGATAATGATTGCTGTTACGATGGTGAACGTAAACCT GTTTTATCCTGCAGAGCCTCTTTATTTTATAGCTTTATCAATTTATCTTAATAGACAGA ATAGTCTTTCTCTAAATATATTTTATGGTCTGCTGCCTGTTGCCAGTTCTGACTTGTTT AGGCGGGCAATCATATTCTTTATCTTGGATGGAACTCAAGGAATTGTAATGGGCAGTAG CATTATAACCACCTATATGATCGAGTTTGCAGGAATAGCGCTAAGTTACCTCTTTCTCA GTGTGTTCAATGTTGATATTGGTCGACTTAAAGATAGTTTGACCAAGATGAAGGTCAAA AAACGCTTGATTCCAATGAATATTACTATGCTTCTATACTACCTTTTAATACAGGTATT GTATGTTATAGAGAGTTATAATGTGATACCGACTTTAAAATTTCGTAAATTTGTCGTTA TTGTCTATCTTATTTTTTTTTTGATTCTGATCTCATTTTTAAGCCAATATACCAAACAA AAGGTTCAAAATGAGATAATGGCACAAAAGGAAGCTCAGATTCGAAATATCACCCAGTA TAGTCAGCAAATAGAATCTCTTTACAAGGATATTCGAAGTTTCCGCCATGATTATCTGA ATATTTTAACTAGCCTCAGATTAGGCATTGAAAATAAAGATTTAGCTAGTATTGAAAAG ATTTACCATCAAATCTTAGAAAAAACAGGACATCAATTGCAGGATACCCGTTATAATAT CGGCCATCTAGCTAATATTCAAAACGATGCTGTCAAGGGTATCTTGTCAGCAAAAATCT TAGAAGCTCAGAATAAAAAGATTGCTGTCAATGTAGAAGTCTCAAGTAAAATACAACTG CCTGAGATGGAGTTGCTTGATTTCATTACCATACTTTCTATCTTGTGTGATAATGCCAT TGAGGCTGCTTTCGAATCATTAAATCCTGAAATTCAGTTAGCCTTTTTTAAGAAAAATG GCAGTATAGTCTTTATCATTCAGAATTCCACCAAAGAAAAACAAATAGATGTGAGTAAA ATTTTTAAAGAAAACTATTCCACTAAAGGCTCCAATCGCGGTATTGGTTTAGCAAAGGT TATTCAAGCAACTCCTAATAATAAAA] TAG

D.
[ATGATTCTATTTTTGTATTGGAAGATGATTTTTTACAACAAGGACGTCTTGAAACCA
CCATTGCAGCTATCATGAAAGAAAAAATTGGTCTTATAAAGAATTGACTATTTTTGGA
AAACCACAACAACTTATTGACGCTATCCCTGAAAAGGGCAATCACCAGATTTTCTTTT
GGATATTGAAATCAAAAAAGAGGAAAAGAAAGGACTGGAAGTAGCCAATCAGATTAGAC
AGCATAATCCTAGTGCAGTTATTGTCTTTGTCACGACACATTCTGAGTTTATGCCCCTC
ACTTTTCAGTATCAGGTATCTGCTTTGGATTTTATTGATAAATCTTTGAATCCTGAGGA
GTTCTCCCACCGCATTGAATCAGCGCTGTATTATGCTATGGAAAACAGCCAGAAGAATG
GTCAATCAGAGGAACTTTTTATTTTCCATTCATCTGAAACTCAGTTTCAGGTCCCTTTT
GCTGAGATTCTGTATTTTGAAACATCTTCAACAGCCCATAAGCTCTGCCTTTATACTTA
TGATGAACGGATTGAATTCTACGGCAGTATGACTTGACATTGTTAAAATGGATAAGAGAC

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Figure 2 (cont'd)

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Methods for

Figure 3

Α.

MKKTLSLKNDFKEIKTDELEIIIGGSGSLSTFFRLFNRSFTQALGK

В.

MNEALMILSNGLLTYLTVLFLLFLFSKVSNVTLSKKELTLFSISNFLIMIAVTMVNVNL FYPAEPLYFIALSIYLNRQNSLSLNIFYGLLPVASSDLFRRAIIFFILDGTQGIVMGSS IITTYMIEFAGIALSYLFLSVFNVDIGRLKDSLTKMKVKKRLIPMNITMLLYYLLIQVL YVIESYNVIPTLKFRKFVVIVYLILFLILISFLSQYTKQKVQNEIMAQKEAQIRNITQY SQQIESLYKDIRSFRHDYLNILTSLRLGIENKDLASIEKIYHQILEKTGHQLQDTRYNI GHLANIQNDAVKGILSAKILEAQNKKIAVNVEVSSKIQLPEMELLDFITILSILCDNAI EAAFESLNPEIQLAFFKKNGSIVFIIQNSTKEKQIDVSKIFKENYSTKGSNRGIGLAKV NHILEHYPKTSLQTSNHHHLFKQLLIIK

C.

MISIFVLEDDFLQQGRLETTIAAIMKEKNWSYKELTIFGKPQQLIDAIPEKGNHQIFFL DIEIKKEEKKGLEVANQIRQHNPSAVIVFVTTHSEFMPLTFQYQVSALDFIDKSLNPEE FSHRIESALYYAMENSQKNGQSEELFIFHSSETQFQVPFAEILYFETSSTAHKLCLYTY DERIEFYGSMTDIVKMDKRLFQCHRSFIVNPANITRIDRKKRLAYFRNNKSCLISRTKL TKLRAVIADQRRAK

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Figure 4

A.

BM71 CSP 1 MKKTPSLKNDFKEIKTDELEIIIGGSGSLSTFFRLFNRSFTQALGK 46
GB14 CSP 1 MKKTLSLKNDFKEIKTDELEIIIGGSGSLSTFFRLFNRSFTQALGK 46
H7 CSP 1 MKKTLSLKNDFKEIKTDELEIIIGGSGSLSTFFRLFNRSFTQALGK 46
JH1005 CSP 1 MKKTLSLKNDFKEIKTDELEIIIGGSGTLSTFFRLFNRSFTQA 43
LT11 CSP 1 MKKTLSLKNDFKEIKTDELEIIIGGSGSLSTFFRLFNRSFTQALGK 46
NG8 CSP 1 MKKTLSLKNDFKEIKTDELEIIIGGSGSLSTFFRLFNRSFTQALGK 46
UAB159 CSP 1 MKKTLSLKNDFKEIKTDELEIIIGGSGSLSTFFRLFNRSFTQALGK 46

B.

THE NEW WINDOWS TO BE

consensus: 1 MKKTLSLKNDFKEIKTDELEIIIGG SGSLSTFFRLFNRSFTQALGK 46
predicted cleavage site:

Figure 5

SGSLSTFFRLFNRSFTQALGK

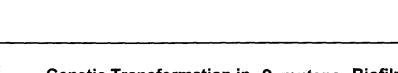
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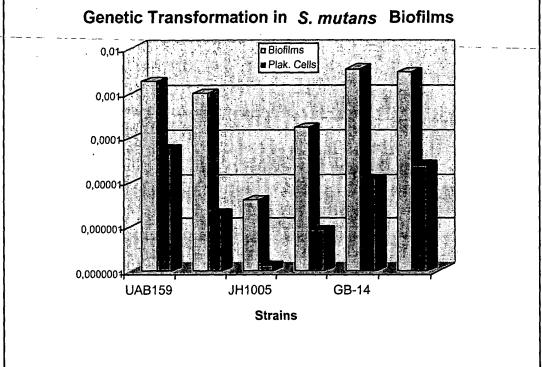
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Figure 6

10 L.M Con Con Cas Cas Ball Ball





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Figure 7

E. H. H. H. C. C. C. L. L. L.

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Strain	Peptide added Number of Transformants/Recipients	No peptide Number of Transformants/Recipients
UAB15 JH1005 ²	4.65 X 10 ⁻¹ 6.98 X 10 ⁻²	1.78 X 10 ⁻⁶

The final concentration of SCSP used was 500 ng/ml.

The strain contains a nonsense mutation in the *comC* gene encoding the CSP.

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Figure 8

ComC region

ComC Primer Pair: F5-B5

Come i inner i an. i 3-b.

[F5] 23406-23424 5'- AGTTTTTTGTCTGGCTGCG -3'

19 nt forward primer pct G+C: 47.4 Tm: 50.5

[B5] 24056-24037 5'- TCCACTAAAGGCTCCAATCG -3'

20 nt backward primer pct G+C: 50.0 Tm: 51.9

651 nt product for F5-B5 pair (23406-24056)

Optimal annealing temp: 50.3 pct G+C: 30.9 Tm: 71.5

ComD region

ComD Primer Pair: F1-B1

[F1] 392-415 5'- CGCTAAGTTACCTCTTTCTCAGTG -3'
24 nt forward primer
pct G+C: 45.8 Tm: 51.6

[B1] 683-663 5'- GCTTCCTTTTGTGCCATTATC -3' 21 nt backward primer pct G+C: 42.9 Tm: 50.8

> 292 nt product for F1-B1 pair (392-683) Optimal annealing temp: 49.5 pct G+C: 30.8 Tm: 70.2

ComE region

ComE Primer Pair: F1-B1

[F1] 145-165 5'- CCTGAAAAGGGCAATCACCAG -3'
21 nt forward primer
pct G+C: 52.4 Tm: 55.9

[B1] 606-585 5'- GCGATGGCACTGAAAAAGTCTC -3'
22 nt backward primer
pct G+C: 50.0 Tm: 55.4

462 nt product for F1-B1 pair (145-606) Optimal annealing temp: 53.6 pct G+C: 38.3 Tm: 74.1

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Figure 9

Sequence Range: 1 to 2557

30 20 40 10 ACATTATGTGTCCTAAGGAAAATATTACTTTTTCAAGAAAATCCATGATT TGTAATACACAGGATTCCTTTTATAATGAAAAAGTTCTTTTAGGTACTAA <K K L F I W S K 60 70 80 90 TTTTCATAAAAATAGTATACTAATTATAATCAAAAAAAGGAGATATAAA AAAAGTATTTTTTATCATATGATTAATATTAGTTTTTTCCTCTATATTT < K M F F L I S I I I L F L L Y L 130 110 120 140 ATGAAAAAACACTATCATTAAAAAATGACTTTAAAGAAATTAAGACTGA TACTTTTTTTGTGATAGTAATTTTTTACTGAAATTTCTTTAATTCTGACT M K K T L S L K N D F K E I K T D> ORF RF[2] <IFFVSDNFFSKLSILVS</pre> 170 180 TGAATTAGAGATTATCATTGGCGGAAGCGGAAGCCTATCAACATTTTTCC ${\tt ACTTAATCTCTAATAGTAACCGCCTTCGCCTTCGGATAGTTGTAAAAAGG}$ E L E I I I G G S G S L S T F F> ORF RF[2] <S N S I I M 210 220 230 240 GGCTGTTTAACAGAAGTTTTACACAAGCTTTGGGAAAATAAGATAGGCTA CCGACAAATTGTCTTCAAAATGTGTTCGAAACCCTTTTATTCTATCCGAT R L F N R S F T Q A L G K> ORF RF[2] _____> 280 290 300 270 ACATTGGAATAAAACAAGGCTGGATTTATTATTCCAGCCTTTTTAAATGT TGTAACCTTATTTTGTTCCGACCTAAATAATAAGGTCGGAAAAATTTACA 320 330 340 350 310 AAAATAAAATACAGGGTTAAATAATCAAGTGTGCTGTCGTGGATGAGAA 370 380 390 360 GATAAAACTATCTCTTAGAGAATAGGCCTCCTCTATTTTATTATTAGGAG CTATTTTGATAGAGAATCTCTTATCCGGAGGAGATAAAATAATAATCCTC $< K \cdot I \quad I \quad L \quad L$ < ORF RF[420 430

TTGCTTGAATAAATGATGATGATTGCTTGTTTGTAAACTGGTTTTTGGGAT AACGAACTTATTTACTACTACTAACGAACAAACATTTGACCAAAACCCTA <Q K F L H H H N S T Q L S T K P Y

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Figure 9 (cont'd - 1)

	ORF	RF[4] C		
460	470	480	490	500
AATGTTCAAGAATATG				ATTGGAG
TACAAGTTCTTATAC				
"TACAAGTTCTTATAC - <h e="" h-<="" i-="" l="" td=""><td></td><td></td><td></td><td></td></h>				
				- N - S
	ORF	RF[4] C		
510	520	530	540	550
CTTTAGTGGAATAGT	TTTCTT	TTTTAAAAAT	ACTCACATCTA	TTTGTTT
GAAATCACCTTATCA				
GKTSYN	E K	F I K	S V D 1	Q K
Thail aireant is an Turking (Carl	ORF	RF[4] C	properties and a substitute with the first south	6. Power
560	570	580	590	600
TTCTTTGGTGGAATTC	TGAATG	ATAAAGACTA	TACTGCCATTI	TTCTTAA
AAGAAACCACCTTAAG				
<e k="" n<="" s="" t="" td=""><td>O I</td><td>r F V I</td><td>S G N</td><td>K K F</td></e>	O I	r F V I	S G N	K K F
	ORF	RF[4] C_	makan pada sara Talahan Sebagai dan dalah sara dalah sara	and a farment of the first of the
		_		
610	620		640	650
AAAAGGCTAACTGAAT				
TTTTCCGATTGACTTA	AAGTCC	TAAATTACTA	AGCTTTCGTC	GGAGTTAC
				M>
	and the same of	July 18 of the 1990, 1889 year forth	and the second section of the second section is a second section of the second section of the second section of	
<f a="" i<="" l="" q="" td=""><td>- E → P</td><td>N L S</td><td>E F A A</td><td>$\mathbf{E} \times \mathbf{I}$</td></f>	- E → P	N L S	E F A A	$\mathbf{E} \times \mathbf{I}$
	ORF	RF[4] C		
660	670	680	690	700
660		880		
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ת ת ת ייים א ווויא	ርጥአጥሮርጥእ አባ	ር እ እ እጥሮ እ እርሮ	ል ል ርጥር ር ል ጥ
GCATTATCACACAAGA				
CGTAATAGTGTGTTC	TATCTTT	CATACCATTA	ACTTTAGTTCG'	TTGAGGTA
	TATCTTT I E	CATACCATTA S M V N		TTGAGGTA
CGTAATAGTGTGTTCT A L S H K	FATCTTT I E OR	CATACCATTA S M V N F RF[3]	ACTTTAGTTCG' 1 K S S	TTGAGGTA N S I
CGTAATAGTGTGTTC	TATCTTT IE OR ISL	CATACCATTA S M V N F RF[3]	ACTTTAGTTCG 1 K S S F D L	TTGAGGTA N S I
CGTAATAGTGTGTTC A L S H K A N D C L	IATCTTT IE OR ORF	CATACCATTA S M V N F RF[3] I T T RF[4] C	ACTTTAGTTCG 1 K S S F D L	ITGAGGTA NSI LE,M
CGTAATAGTGTGTTC A L S H K A N D C L	TATCTTT I E OR ORF	CATACCATTF S M V M F RF[3] I T I RF[4] C	ACTTTAGTTCG' 1 K S S F D L	TTGAGGTA N S I L E M
CGTAATAGTGTGTTCT A L S H K A N D C L 710 CTCAGGCAGTTGTAT	I E OR I S L ORF 720 TTTACTT	CATACCATTA S M V M F RF[3] I T I RF[4] C 730 GAGACTTCTA	ACTTTAGTTCG'  K S S  F D L  740  ACATTGACAGC	TTGAGGTA N S I L E M 750 AATCTTT
CGTAATAGTGTGTTCT A L S H K A N D C L 710 CTCAGGCAGTTGTATTGAGTCCGTCAACATA	IATCTTT I E OR I S L ORF 720 TTTACTT	CATACCATTA S M V M F RF[3] I T T I RF[4] C 730 GAGACTTCTA	ACTTTAGTTCG'  K S S  F D L  740  ACATTGACAGC  IGTAACTGTCG	TTGAGGTA N S I L E M 750 AATCTTTT
CGTAATAGTGTGTTCT A L S H K A N D C L 710 CTCAGGCAGTTGTATTGAGTCCGTCAACATA	IATCTTT I E OR I S L ORF 720 TTTACTT AAATGAA	CATACCATTA S M V M F RF[3]	ACTTTAGTTCG'  K S S  F D L  740  ACATTGACAGC  GTAACTGTCG  T L T A	TTGAGGTA N S I L E M 750 AATCTTT TTAGAAAA I F>
CGTAATAGTGTGTTCT A L S H K A N D C L 710 CTCAGGCAGTTGTATTGAGTCCGTCAACATA	IATCTTT I E OR I S L ORF 720 TTTACTT AAATGAA	CATACCATTA S M V M F RF[3]	ACTTTAGTTCG'  K S S  F D L  740  ACATTGACAGC  GTAACTGTCG  T L T A	TTGAGGTA N S I L E M 750 AATCTTT TTAGAAAA I F>
CGTAATAGTGTGTTCT A L S H K A N D C L 710 CTCAGGCAGTTGTATTGAGTCCGTCAACATALS G S C I	TATCTTT I E OR ORF 720 TTTACTT AAATGAA L L OR	CATACCATTAS M V M F RF[3] F RF[4] C 730 GAGACTTCTA CTCTGAAGAT E T S EF RF[3] S V E	ACTTTAGTTCG'  K S S  F D L  740  ACATTGACAGC  IGTAACTGTCG  T L T A	TTGAGGTA N S I L E M 750 AATCTTT TTAGAAAA I F>
CGTAATAGTGTGTTCT A L S H K A N D C L 710 CTCAGGCAGTTGTATTGAGTCCGTCAACATALS G S C I	TATCTTT I E OR ORF 720 TTTACTT AAATGAA L L OR	CATACCATTA S M V M F RF[3]	ACTTTAGTTCG'  K S S  F D L  740  ACATTGACAGC  IGTAACTGTCG  T L T A	TTGAGGTA N S I L E M 750 AATCTTT TTAGAAAA I F>
CGTAATAGTGTGTTCT A L S H K A N D C L 710 CTCAGGCAGTTGTATTGAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCCGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACATAGTCAACAATAGTCAACAACAATAGTCAACAATAGTCAACAACAATAGTCAACAAAAAAAA	TATCTTT  I E OR ORF  720 TTTACTT AAATGAA L L OR K S	CATACCATTA S M V M F RF[3] I T I RF[4] C 730 GAGACTTCTA CTCTGAAGA E T S EF RF[3] S V E RF[4] C	ACTTTAGTTCG'  K S S  F D L  740  ACATTGACAGC  GGTAACTGTCG  T L T A	TTGAGGTA N S I L E M 750 AATCTTTT TTAGAAAA I F>
CGTAATAGTGTGTTCT A L S H K  A N D C L  710  CTCAGGCAGTTGTATT GAGTCCGTCAACATAL S G S C I <e i<="" l="" p="" q="" td=""><td>TATCTTT I E OR ORF 720 TTTACTT AAATGAA L L OR ORF</td><td>CATACCATTES M V M F RF[3] I T I RF[4] C 730 GAGACTTCTA CTCTGAAGA E T S F RF[3] S V E 780</td><td>ACTTTAGTTCG'  K S S  F D L  740  ACATTGACAGC  GGTAACTGTCG  T L T A  V N V A</td><td>TTGAGGTA N S I L E M 750 AATCTTTT TTAGAAAA I F&gt; I K K</td></e>	TATCTTT I E OR ORF 720 TTTACTT AAATGAA L L OR ORF	CATACCATTES M V M F RF[3] I T I RF[4] C 730 GAGACTTCTA CTCTGAAGA E T S F RF[3] S V E 780	ACTTTAGTTCG'  K S S  F D L  740  ACATTGACAGC  GGTAACTGTCG  T L T A  V N V A	TTGAGGTA N S I L E M 750 AATCTTTT TTAGAAAA I F> I K K
CGTAATAGTGTGTTCT A L S H K  A N D C L  710  CTCAGGCAGTTGTATT GAGTCCGTCAACATAG S G S C I <e 760="" i="" l="" p="" q="" tattctgagcttcta<="" td=""><td>TATCTTT I E OR ORF 720 TTTACTT AAATGAA L L OR K S ORF</td><td>CATACCATTA S M V M F RF[3] I T I RF[4] C 730 GAGACTTCTA CTCTGAAGA E T S F RF[3] S V E 780 TGCTGACAA</td><td>ACTTTAGTTCG'  K S S  740  ACATTGACAGC  IGTAACTGTCG  T L T A  V N V A  790  GATACCCTTGA</td><td>TTGAGGTA N S I L E M 750 AATCTTTT TTAGAAAA I F&gt; I K K</td></e>	TATCTTT I E OR ORF 720 TTTACTT AAATGAA L L OR K S ORF	CATACCATTA S M V M F RF[3] I T I RF[4] C 730 GAGACTTCTA CTCTGAAGA E T S F RF[3] S V E 780 TGCTGACAA	ACTTTAGTTCG'  K S S  740  ACATTGACAGC  IGTAACTGTCG  T L T A  V N V A  790  GATACCCTTGA	TTGAGGTA N S I L E M 750 AATCTTTT TTAGAAAA I F> I K K
CGTAATAGTGTGTTCT A L S H K  A N D C L  710  CTCAGGCAGTTGTATT GAGTCCGTCAACATALT S G S C I <e 760="" ataagactcgaagat<="" i="" l="" p="" q="" tattctgagcttcta="" td=""><td>TATCTTT I E OR ORF 720 TTTACTT AAATGAA L L OR K S ORF</td><td>CATACCATTA S M V M F RF[3] I T I RF[4] C 730 GAGACTTCTA CTCTGAAGA E T S F RF[3] S V E 780 TGCTGACAA</td><td>ACTTTAGTTCG'  K S S  740  ACATTGACAGC  IGTAACTGTCG  T L T A  V N V A  790  GATACCCTTGA</td><td>TTGAGGTA N S I L E M 750 AATCTTTT TTAGAAAA I F&gt; I K K</td></e>	TATCTTT I E OR ORF 720 TTTACTT AAATGAA L L OR K S ORF	CATACCATTA S M V M F RF[3] I T I RF[4] C 730 GAGACTTCTA CTCTGAAGA E T S F RF[3] S V E 780 TGCTGACAA	ACTTTAGTTCG'  K S S  740  ACATTGACAGC  IGTAACTGTCG  T L T A  V N V A  790  GATACCCTTGA	TTGAGGTA N S I L E M 750 AATCTTTT TTAGAAAA I F> I K K
CGTAATAGTGTGTTCT A L S H K  A N D C L  710  CTCAGGCAGTTGTATT GAGTCCGTCAACATAG S G S C I <e 760="" i="" l="" p="" q="" tattctgagcttcta<="" td=""><td>TATCTTT I E OR ORF 720 TTTACTT AAATGAA L L OR K S ORF</td><td>CATACCATTA S M V M F RF[3] I T I RF[4] C 730 GAGACTTCTA CTCTGAAGA E T S F RF[3] S V E 780 TGCTGACAA</td><td>ACTTTAGTTCG'  K S S  740  ACATTGACAGC  IGTAACTGTCG  T L T A  V N V A  790  GATACCCTTGA</td><td>TTGAGGTA N S I L E M 750 AATCTTTT TTAGAAAA I F&gt; I K K</td></e>	TATCTTT I E OR ORF 720 TTTACTT AAATGAA L L OR K S ORF	CATACCATTA S M V M F RF[3] I T I RF[4] C 730 GAGACTTCTA CTCTGAAGA E T S F RF[3] S V E 780 TGCTGACAA	ACTTTAGTTCG'  K S S  740  ACATTGACAGC  IGTAACTGTCG  T L T A  V N V A  790  GATACCCTTGA	TTGAGGTA N S I L E M 750 AATCTTTT TTAGAAAA I F> I K K
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1889-00401

Atty's Docket No. 1889-00401 Applicants: Dennis CVITKOVIT Title: Signal Peptides, Nucleic Treatment of Caries 09/833,017 Molecules and Methods for

Sheet 11 of 19

## Figure 9 (cont'd - 2)

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Applicants: Dennis CVITKOVTCH, et al.
Title: Signal Peptides, Nucle and Molecules and Methods for Treatment of Caries 09/833,017
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## Figure 9 (cont'd - 3)

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GTA CAT T CTT GAA <k< td=""><td>1 ACAG TGTC V A 1 TTTC AAAG K</td><td>560 CAA GTT 610 GAT CTA S</td><td>TCA AGT M AAA TTT L</td><td>TTA</td><td>1570 ATCA FAGT  162 GACA CTGT  V  167 AAGT</td><td>A ORF  ORF  ORF  ORF  ORF  ORF  ORF</td><td>RF AAT TTA RF CTT GAA S RF</td><td>Y [4]  19 TGG ACC ACC ACC ACC ACC ACC ACC ACC ACC A</td><td>F C C S S S S S S S S S S S S S S S S S</td><td>ATC</td><td>CGA SCT NAA</td><td>N 1 AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA</td><td>V.59 AAA TTT L64 ATO L</td><td>0 AG. TC' L 0 AA TTT- F</td><td>AGT TCZ ACZ TGT</td><td>TAAC</td><td>16 AATI TTA 16 GAC CTC L</td><td>OOO EE</td></k<>	1 ACAG TGTC V A 1 TTTC AAAG K	560 CAA GTT 610 GAT CTA S	TCA AGT M AAA TTT L	TTA	1570 ATCA FAGT  162 GACA CTGT  V  167 AAGT	A ORF  ORF  ORF  ORF  ORF  ORF  ORF	RF AAT TTA RF CTT GAA S RF	Y [4]  19 TGG ACC ACC ACC ACC ACC ACC ACC ACC ACC A	F C C S S S S S S S S S S S S S S S S S	ATC	CGA SCT NAA	N 1 AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	V.59 AAA TTT L64 ATO L	0 AG. TC' L 0 AA TTT- F	AGT TCZ ACZ TGT	TAAC	16 AATI TTA 16 GAC CTC L	OOO EE
GTACCATT T CTTT GAA ATA	1 ACAG TGTC V A 1 TTTC AAAG K	5600 CAAA GTT 6100 GGTT 6CTA SCTA 8CGGT	TCA AGT MAAA TTT L	TTA	1570 ATCA FAGT L L 162 GACA CTGT V 167 AAGT	A ORF  OGAA CTT  FORF  ORF  ORF  ORF  ORF	RF AAT TTA CTT GAA S TAA	Y [4]  19 TGG ACG TACG V  10 AACG TTGG	F C C C C C C C C C C C C C C C C C C C	ATO TAC TCT	CGA GCT S	I I I I I I I I I I I I I I I I I I I	V.59 AAA TTT L64 FAG L69 EAT	0 AG TC L 0 AA TT VTC	AGT TCI TCI ACI TGI	TAAC	16 GACCTCC	OO TO ACT
GTACCATT  CTTT  GAA <k ata="" tat<="" td=""><td>1 ACAG TGTC V A 1 TTTC AAAG K</td><td>5600 CAAA GTT 6100 GGTT 6CTA SCTA 8CGGT</td><td>TCA AGT AAA TTT L</td><td>GTO CTA</td><td>1570 ATCA FAGT L L 162 GACA CTGT V 167 AAGT</td><td>A ORF ORF ORF ORF ORF ORF ORF TAA ATT L</td><td>RF AAT TTA RF CTT GAA S RF</td><td>Y [4]  1! TGG ACG ACG ACG ACG ACG ACG ACG ACG ACG A</td><td>F C C C C C C C C C C C C C C C C C C C</td><td>ATC TAC AGA TC</td><td>CGA SCTT</td><td>N 1 1 AA 1 T I AA 1 T I AA 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A 1 T I A A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A</td><td>V.59</td><td>0 AG TC L 0 AA TT VTC</td><td>AGT TCI TCI ACI TGI</td><td>TAAC</td><td>16 GACCTCC</td><td>OO TOO</td></k>	1 ACAG TGTC V A 1 TTTC AAAG K	5600 CAAA GTT 6100 GGTT 6CTA SCTA 8CGGT	TCA AGT AAA TTT L	GTO CTA	1570 ATCA FAGT L L 162 GACA CTGT V 167 AAGT	A ORF ORF ORF ORF ORF ORF ORF TAA ATT L	RF AAT TTA RF CTT GAA S RF	Y [4]  1! TGG ACG ACG ACG ACG ACG ACG ACG ACG ACG A	F C C C C C C C C C C C C C C C C C C C	ATC TAC AGA TC	CGA SCTT	N 1 1 AA 1 T I AA 1 T I AA 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A A 1 T I A 1 T I A A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A 1 T I A	V.59	0 AG TC L 0 AA TT VTC	AGT TCI TCI ACI TGI	TAAC	16 GACCTCC	OO TOO

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Title: Signal Peptides, National Acid Molecules and Methods for

Title: Signal Peptides, No. Ac Treatment of Caries 09/833,017

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#### Figure 9 (cont'd - 4)

TCATTCATTTTGCTCTCCTTTGATCAGCAATCACAGCTCTCAGTTTTGTT AGTAAGTAAAACGAGAGGAAACTAGTCGTTAGTGTCGAGAGTCAAAACAA <E N M <KARRQDAIVARLKT ORF RF[5] C 1760 1770 1780 AACTTAGTTCGTGAAATAAGACAAGACTTATTATTTCGAAAATAGGCCAA TTGAATCAAGCACTTTATTCTGTTCTGAATAATAAAGCTTTTATCCGGTT <LKTRSILCSKNNRFYAL ORF RF[5] C 1810 1820 1830 1840 1850 GCGTTTTTTCCGATCAATACGGGTAATATTGGCAGGATTGACAATAAAAG CGCAAAAAAGGCTAGTTATGCCCATTATAACCGTCCTAACTGTTATTTTC <R K K R D I R T I N A P N V I F S</pre> ORF RF[5] C 1860 1870 1880 1890 MALKKSLIHFNNVSH> ORF RF[1]  $<\!R-H-C-Q-F-L-R-K-D-M-K-V-I-D-T-M$ ORF RF[5] C____ 1910 1920 1930 CTGCCGTAGAATTCAATCCGTTCATCATAAGTATAAAGGCAGAGCTTATG GACGGCATCTTAAGTTAGGCAAGTAGTATTCATATTTCCGTCTCGAATAC TAVEFNPFIISIKAEL M> ORF RF[1] <S G Y F E I R E D Y T Y L C L K H ORF RF[5] C GNMMLIFAS ORF RF[6] C 1960 1970 1980 1990 2000 GGCTGTTGAAGATGTTTCAAAATACAGAATCTCAGCAAAAGGGACCTGAA CCGACAACTTCTACAAAGTTTTATGTCTTAGAGTCGTTTTCCCTGGACTT G C> <A T S S T E F Y L I E A F P V Q F ORF RF[5] C KLICFRLLLSRF ORF RF[6] C 2020 2030 2040 2050 ACTGAGTTTCAGATGAATGGAAAATAAAAAGTTCCTCTGATTGACCATTC TGACTCAAAGTCTACTTACCTTTTATTTTTCAAGGAGACTAACTGGTAAG <Q T E S S H F I F L E E S Q G N ORF RF[5] C <S L K L H I S F L F N R Q N V M R</pre> ORF RF[6] C

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Figure 9 (cont'd - 5)

2060	2070	2080	2090	2100
TTCTGGCTGTTT	TCCATAGCATA	ATACAGCGC'	TGATTCAATG	CGGTGGGA
AAGACCGACAAA K Q S N				
· ·	ORF	RF[5] C		
- <r -="" a="" f<="" t="" td=""><td>C -WLM-</td><td></td><td></td><td></td></r>	C -WLM-			
ORF RF	[6] C			
	2120			
GAACTCCTCAGO				
CTTGAGGAGTCC				
2160	2170	2180	2190	2200
GATACTGAAAA				
CTATGACTTTTC	'ACTCCCCGTA'		ACACAGCACT M C R D	
<y 0="" 7<="" f="" td=""><td>L P M ORF</td><td>F E S RF[5] C</td><td>H PT TyV</td><td>F V</td></y>	L P M ORF	F E S RF[5] C	H PT TyV	F V
	2220			2250
ATAACTGCACTA				
TATTGACGTGAT				
N N C T	R I M L	S N L	I G Y	F Q S>
I V A S	P N H O	R IO	N A V	E L G
17 - 12, 27 & 27 & 27 & 28 (	ORF	RF[5] C	######################################	Taki Mari isik ##
2260	2270	2280	2290	2300
TTTCTTTTCCT				
AAAGAAAAGGAG	JAAAAAACTAA	AGTTATAGGT	TTTTCTTTTA	GACCACTA
F L F L	FFDI	FNIQ	KEN	r A I
K K E E		E I D L	. F - F - I -	Q H N
2310 TGCCCTTTTCAC			2340	
ACGGGAAAAGT				
	RDSV			
<g e<="" k="" td=""><td>P I A D</td><td>I L Q</td><td>Q P K G</td><td>FI</td></g>	P I A D	I L Q	Q P K G	FI
·	ORF	RF[5] C		
	2370			-
GTCAATTCTTT				
CAGTTAAGAAA? S Q F F				
	,		MIA	A M V
T L E K	Y S W N	K E K	MIA	AIT
· · · · · · · · · · · · · · · · · · ·	ORF	RF[5] C		
2410	2420	2430	2440	2450

2410 2420 2430

2440

2450

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Figure 9 (cont'd - 6)

GGTTTCAAGACGTCCTTGTTGTAAAAAATCATCTTCCAATACAAAAATAG CCAAAGTTCTGCAGGAACAACATTTTTTAGTAGAAGGTTATGTTTTTATC

G F K T S L L> V S R R P C C K K S S S N T K I>

<T E L R G Q Q L F D D E L V F I S ORF RF[5] C_

2460 2470 2480 2490 2500 AAATCATTATTTCTCCTTTAATCTTCTATTTAGGTTAGCTGATTAACACT TTTAGTAATAAAGAGGAAATTAGAAGATAAATCCAATCGACTAATTGTGA E I I I S P L I F Y L G>

<I M

2510 2520 2530 ATACACAGAAAAGGTATAAAACGATATCACTCAATAAAATCTACTAACTT  ${\tt TATGTGTCTTTTCCATATTTTGCTATAGTGAGTTATTTTAGATGATTGAA}$ 

AATAACC TTATTGG Atty's Docket No. 1889-00401 Applicants: Dennis CVITKOVITCH, et al.

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Figure 10

Α

В.

MEEDFEIVFNKVKPIVWKLSRYYFIKMWTREDWQQEGMLILHQLLREHPELEEDDTKLY IYFKTRFSNYIKDVLRQQESQKRRFNRMSYEEVGEIEHCLSSGGMQLDEYILFRDSLLA YKQGLSTEKQELFERLVAGEHFLGRQSMLKDLRKKLSDFKEK

C.

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GTAAATAAAACAGCCAGTTAAGATGGGACATTTATGTCCTGTTCTTAAAGTCTTTTTCG
TTTTATAATAATTTTATTATAAAAGGAGGTCATCGTAATAGATGGAAGAAGATTTTGAA
ATTGTTTTTAATAAGGTTAAGCCAATTGTATGGAAAATTAAGCCGTTATTACTTTATTAA
AATGTGGACTCGTGAAGATTGGCAACAAGAGGGAATGTTGATTTTGCACCAATTATTAA
GGGAACATCCAGAATTAGAAGAGGGATGATACAAAAATTGTATATCTATTTTAAGACACGT
TTTTCTAATTACATTAAAGATGTTTTGCGTCAGCAAGAAAGTCAGAAACGTCGTTTTAA
TAGAATGTCTTATGAAGAAGTCGGTGAGATTGAACACTGTTTGTCAAGTGGCGGTATGC
AATTGGATGAATATTTTTATTTCGTGATAGTTTGCTTGCATATAAACAAGGTCTGAGT
ACTGAAAAGCAAGAGCTGTTTGAGCGCTTTGGTAGCAGGAGAACCTTTTTTGGGAAGGCA
AAGTATGCTGAAAGATTTACGTAAAAAATTAAGTGATTTAAGGAAAAATTAAAAA
GGGAAAGAATGGAACATGTGATTGTACCATTCTTTTTGGTTGAAAATTAAGAAAAGTTA
TTATAAATTATTGGTTTAACATGCCATATTA

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Figure 11

A.

ATGAAACAAGTTATTTATGTTGTTTTAATCGTCATAGCCGTTAACATTCTCTTAGAGAT TATCAAAAGAGTAACAAAAAGGGGAGGGACAGTTTCGTCATCTAATCCTTTACCAGATG GGCAGTCTAAGTTGTTTTGGCGCAGACATTATAAGCTAGTACCTCAGATTGATACCAGA GACTGTGGGCCGGCAGTGCTGGCATCTGTTGCAAAGCATTACGGATCTAATTACTCTAT CGCTTATCTGCGGGAACTCTCAAAGACTAACAAGCAGGGAACAACAGCTCTTGGCATTG TTGAAGCTGCTAAAAAGTTAGGCTTTGAAACACGCTCTATCAAGGCGGATATGACGCTT TTTGATTATAATGATTTGACCTATCCTTTTATCGTCCATGTGATTAAAGGAAAACGTCT GCAGCATTATTATGTCGTCTATGGCAGCCAGAATAATCAGCTGATTATTGGAGATCCTG ATCCTTCAGTTAAGGTGACTAGGATGAGTAAGGAACGCTTTCAATCAGAGTGGACAGGC CTTGCAATTTTCCTAGCTCCTCAGCCTAACTATAAGCCTCATAAAGGTGAAAAAAATGG TTTGTCTAATTTCTTCCCGTTGATCTTTAAGCAGAAAGCTTTGATGACTTATATTATCA TAGCTAGCTTGATTGTGACGCTCATTGATATTGTCGGATCATACTATCTCCAAGGAATA TTGGACGAGTACATTCCTGATCAGCTGATTTCAACTTTAGGAATGATTACGATTGGTCT GATAATAACCTATATTATCCAGCAGGTCATGGCTTTTGCAAAAGAATACCTCTTGGCCG TACTCAGTTTGCGTTTAGTCATTGATGTTATCCTGTCTTATATCAAACATATTTTTACG CTTCCTATGTCTTTCTTTGCGACAAGGCGAACAGGAGAAATCACGTCTCGTTTTACAGA TGCCAATCAGATTATTGATGCTGTAGCGTCAACCATCTTTTCAATCTTTTTAGATATGA CTATGGTAATTTTGGTTGGTGGGGTTTTGTTGGCGCAAAACAATAACCTTTTCTTA ACCTTGCTCTCCATTCCGATTTATGCCATCATTATTTTTTGCTTTCTTGAAACCCTTTGA GAAAATGAATCACGAAGTGATGGAAAGCAATGCTGTGGTAAGTTCTTCTATCATTGAAG ATATCAATGGGATGGAAACCATTAAATCACTCACAAGTGAGTCCGCTCGTTATCAAAAC ATTGATAGTGAATTTGTTGATTATTTGGAGAAAAACTTTAAGCTACACAAGTATAGTGC CATTCAAACCGCATTAAAAAGCGGTGCTAAGCTTATCCTCAATGTTGTCATTCTCTGGT ATGGCTCTCGTCTAGTTATGGATAATAAAATCTCAGTTGGTCAGCTTATCACCTTTAAT GCTTTGCTGTCTTATTTCTCAAATCCAATTGAAAATATTATCAATCTGCAATCCAAACT GCAGTCAGCTCGCGTTGCCAATACACGTCTTAATGAGGTCTATCTTGTCGAATCTGAAT TTGAAAAAGACGGCGATTTATCAGAAAATAGCTTTTTAGATGGTGATATTTCGTTTGAA AATCTTTCTTATAAATATGGATTTGGGCGAGATACCTTATCAGATATTAATTTATCAAT CAAAAAAGGCTCCAAGGTCAGTCTAGTTGGAGCCAGTGGTTCTGGTAAAACAACTTTGG CTAAACTGATTGTCAATTTCTACGAGCCTAACAAGGGGATTGTTCGAATCAATGGCAAT GATTTAAAAGTTATTGATAAGACAGCTTTGCGGCGGCATATTAGCTATTTGCCGCAACA GGCCTATGTTTTTAGTGGCTCTATTATGGATAATCTCGTTTTTAGGAGCTAAAGAAGGAA CGAGTCAGGAAGACATTATTCGTGCTTGTGAAATTGCTGAAATCCGCTCGGACATTGAA  ${\tt CAAATGCCTCAGGGCTATCAGACAGAGTTATCAGATGGTGCCGGTATTTCTGGCGGTCA}$ AAAACAGCGGATTGCTTTAGCTAGGGCCTTATTAACACAGGCACCGGTTTTGATTCTGG ATGAAGCCACCAGCAGTCTTGATATTTTGACAGAAAAGAAAATTATCAGCAATCTCTTA CAGATGACGGAGAAAACAATAATTTTTGTTGCCCACCGCTTAAGCATTTCACAGCGTAC TGACGAAGTCATTGTCATGGATCAGGGAAAAATTGTTGAACAAGGCACTCATAAGGAAC TTTTAGCTAAGCAAGGTTTCTATTATAACCTGTTTAAT

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Figure 11 (cont'd)

В. MKQVIYVVLIVIAVNILLEIIKRVTKRGGTVSSSNPLPDGQSKLFWRRHYKLVPQIDTR DCGPAVLASVAKHYGSNYSIAYLRELSKTNKQGTTALGIVEAAKKLGFETRSIKADMTL FDYNDLTYPFIVHVIKGKRLQHYYVVYGSQNNQLIIGDPDPSVKVTRMSKERFQSEWTG LAIFLAPQPNYKPHKGEKNGLSNFFPLIFKQKALMTYIIIASLIVTLIDIVGSYYLQGI LDEYIPDQLISTLGMITIGLIITYIIQQVMAFAKEYLLAVLSLRLVIDVILSYIKHIFT LPMSFFATRRTGEITSRFTDANQIIDAVASTIFSIFLDMTMVILVGGVLLAQNNNLFFL TLLSIPIYAIIIFAFLKPFEKMNHEVMESNAVVSSSIIEDINGMETIKSLTSESARYQN IDSEFVDYLEKNFKLHKYSAIQTALKSGAKLILNVVILWYGSRLVMDNKISVGQLITFN t ALLSYFSNPIENIINLQSKLQSARVANTRLNEVYLVESEFEKDGDLSENSFLDGDISFE ${ t NLSYKYGFGRDTLSDINLSIKKGSKVSLVGASGSGKTTLAKLIVNFYEPNKGIVRINGN$ DLKVIDKTALRRHISYLPQQAYVFSGSIMDNLVLGAKEGTSQEDIIRACEIAEIRSDIE QMPQGYQTELSDGAGISGGQKQRIALARALLTQAPVLILDEATSSLDILTEKKIISNLL QMTEKTIIFVAHRLSISQRTDEVIVMDQGKIVEQGTHKELLAKQGFYYNLFN

C. ATGGATCCTAAATTTTTACAAAGTGCAGAATTTTATAGGAGACGCTATCATAATTTTGC GACACTATTAATTGTTCCTTTGGTCTGCTTGATTATCTTCTTGGTCATATTCCTTTGTT TTGCTAAAAAGAAATTACAGTGATTTCTACTGGTGAAGTTGCACCAACAAAGGTTGTA GATGTTATCCAATCTTACAGTGACAGTTCAATCATTAAAAATAATTTAGATAATAATGC AGCTGTTGAGAAGGGAGACGTTTTAATTGAATATTCAGAAAATGCCAGTCCAAACCGTC AGACTGAACAAAAGAATATTATAAAAGAAAGACAAAAACGAGAAGAGAAGGAAAAGAAA AAACACCAAAAGAGCAAGAAAAAGAAGAAGTCTAAGAGCAAGAAAGCTTCCAAAGATAA GAAAAAGAAATCGAAAGACAAGGAAAGCAGCTCTGACGATGAAAATGAGACAAAAAAGG TTTCGATTTTTGCTTCAGAAGATGGTATTATTCATACCAATCCCAAATATGATGGTGCC AATATTATTCCGAAGCAAACCGAGATTGCTCAAATCTATCCTGATATTCAAAAAAACAAG AAAAGTGTTAATCACCTATTATGCTTCTTCTGATGATGTTGTTTCTATGAAAAAGGGGC AAACCGCTCGTCTTTCCTTGGAAAAAAAGGGAAATGACAAGGTTGTTATTGAAGGAAAA ATTAACAATGTCGCTTCATCAGCAACTACTACTAAAAAAGGAAATCTCTTTAAGGTTAC TGCCAAAGTAAAGGTTTCTAAGAAAAATAGCAAACTCATCAAGTATGGTATGACAGGCA AGACAGTCACTGTCATTGATAAAAAGACTTATTTTGATTATTTCAAAGATAAATTACTG CATAAAATGGATAAT

D. MDPKFLQSAEFYRRRYHNFATLLIVPLVCLIIFLVIFLCFAKKEITVISTGEVAPTKVV DVIQSYSDSSIIKNNLDNNAAVEKGDVLIEYSENASPNRQTEQKNIIKERQKREEKEKK KHQKSKKKKKSKSKKASKDKKKKSKDKESSSDDENETKKVSIFASEDGIIHTNPKYDGA NIIPKQTEIAQIYPDIQKTRKVLITYYASSDDVVSMKKGQTARLSLEKKGNDKVVIEGK INNVASSATTTKKGNLFKVTAKVKVSKKNSKLIKYGMTGKTVTVIDKKTYFDYFKDKLL HKMDN

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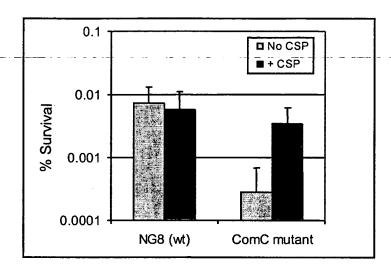


Figure 12